TECHNICAL REPORT
テクニカル リポート

ASAHI PENTAX SPF (Product No. 23110)

Characteristic features

1 Ammeter

2 Linear and level adjustments of CdS photo-cells

3 Photo - SW

特 徴

1. メーター

2. Cds特性の直線性とレベル調整

3. フォトスウィッチ

1. Ammeter (J100)

It should be considered as an differential Ammeter involving two ammeters in one unit.

Three lead wires of Ammeter (J100) are connected each to Ground (red), CdS (blue) and VR (yellow).

The needle of Ammeter (J100) comes just in the middle when the same current value flows in both CdS and VR side.

1. メーター(J100)

2個のメーターが1個に収められている差動型メーターである。

3本のリード線はそれぞれアース(赤)、Cds(青) VR(黄)に接続している。

Cds側とVR側に同じ電流が流れた時にメーターの針が真中をさす様になっている。

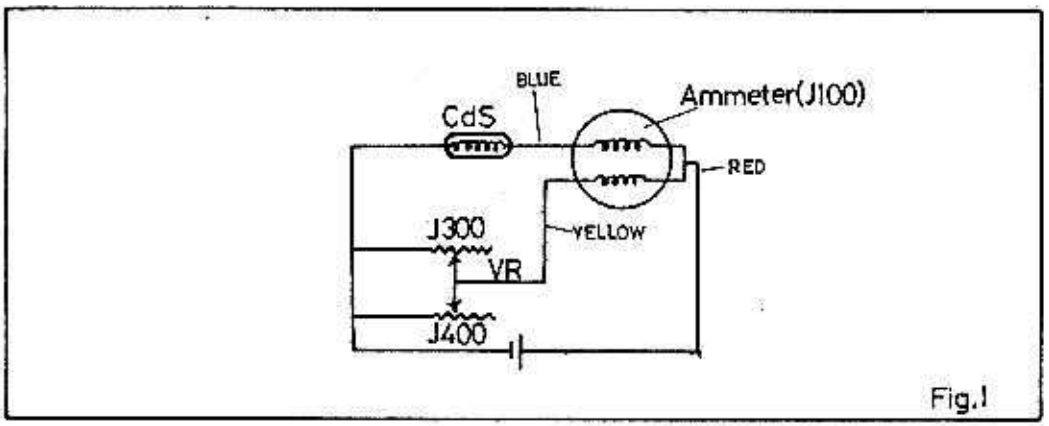


Fig.1

When the current value of CdS side becomes larger than VR side, the needle of Ammeter (J100) goes up.

On the contrary, in case of larger current value in VR side, the needle of Ammeter (J100) goes down.

Cds側の電流がVR側より大きくなると、メーターの針は上にあがり、逆に、VR側の電流が大きいと針は下に下がる。

2. Linear and level adjustments of CdS photo-cells.

(A) Linear adjustment (Full aperture metering)

Adjust high EV (EV16) with left variable resistor and low EV (EV12, EV8) with right one.

2. Cds特性の直線性とレベル調整

(A)直線性調整(開放測光)

高輝度(EV16)を左側の可変抵抗を利用し、低輝度(EV 12、EV 8)を右側の可変抵抗を利用して調整する。

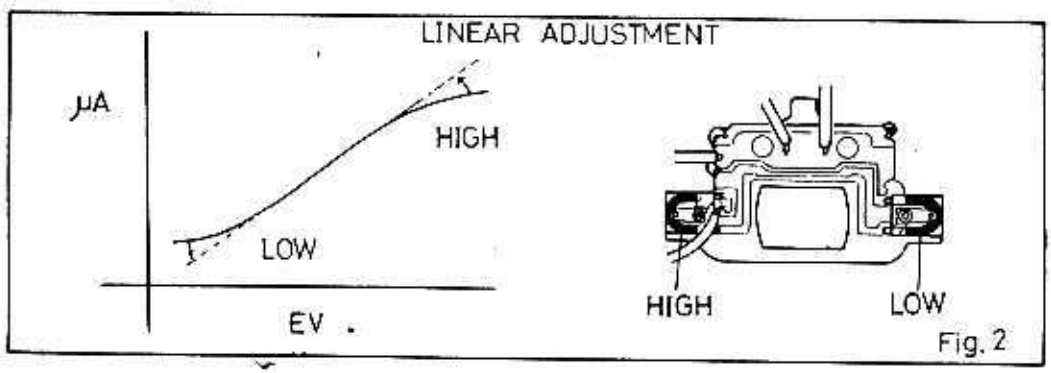


Fig. 2

(Stop down metering)

Adjust the needle indication with variable resistor in Fig. 3.

(絞り込み測光)

絞り込み測光調整はFig 3の可変抵抗を利用して行なう。

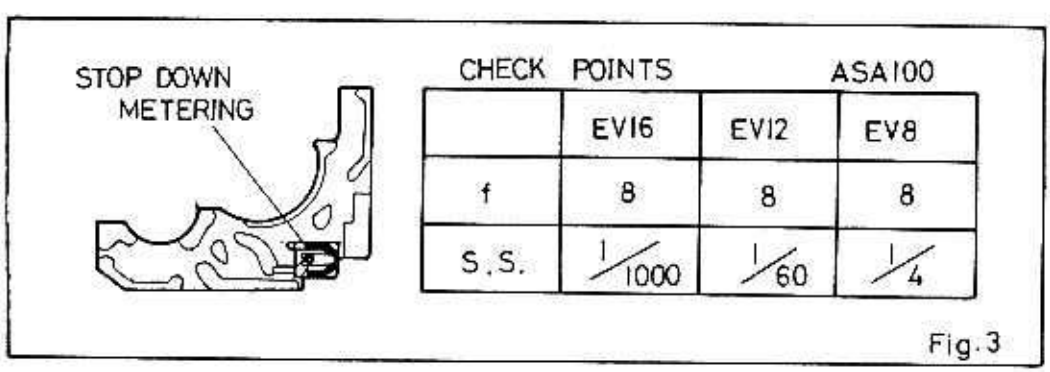


Fig. 3

(B) Level adjustment

When the needle of Ammeter (J100) points at within allowances in each measuring point, no adjustment is necessary.

NOTE: IT SHOULD NEVER BE ADJUSTED WHEN THE NEEDLE OF AMMETER (J100) INDICATES WITHIN ALLOWANCES

However, when the needle points at lower (or higher) beyond allowances, put fixed resistor (J504) of proper Values on CdS (or VR) side.

(B) レベル調整

各々の測光点でメーターの針が許容範囲内にあれば調整の必要はない。

注意：メーターの指示が許容範囲内にあればこの調整の必要はない。

しかし、メーターの針が許容範囲をこえて下に下がっている(又は上がっている)時は、適当な抵抗値の固定抵抗(J504)をCds側(又はVR側)にとりつける。

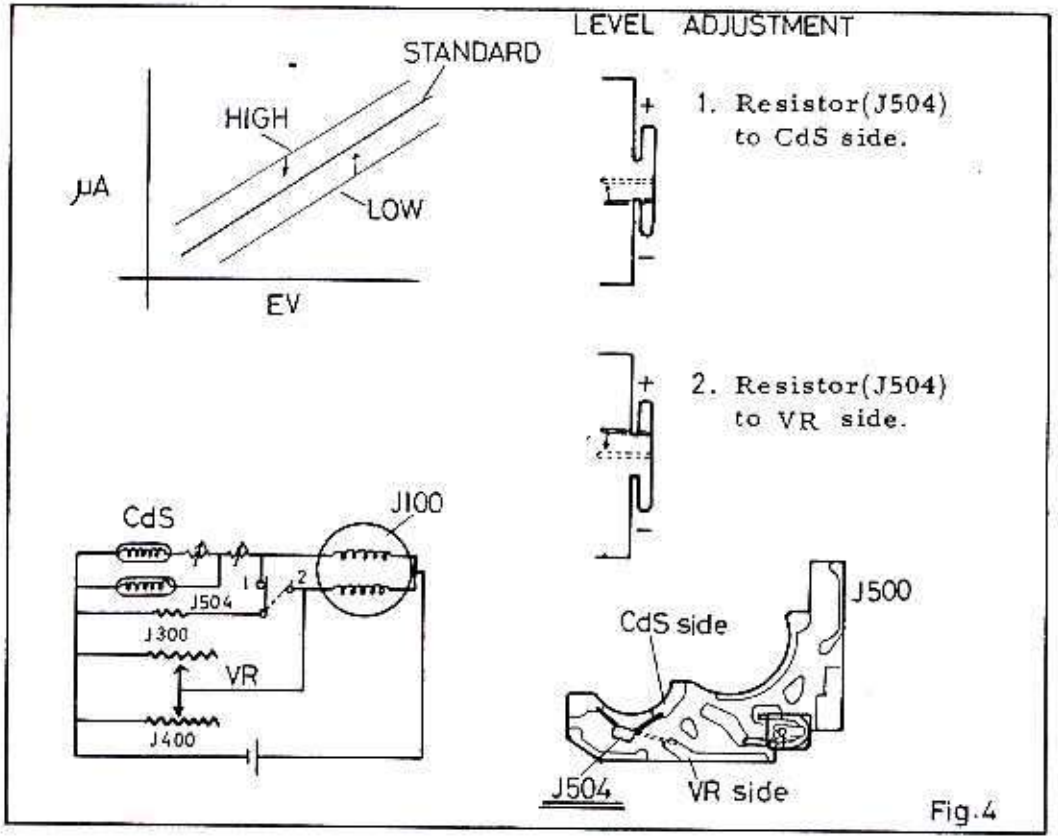


Fig.4

Ten kinds of fixed resistors (J504) are used.

114 = 110 KΩ, 134 = 130KΩ, 154 = 150KΩ, 164 = 160KΩ,
184 = 180 KΩ, 224 = 220KΩ, 274 = 270KΩ, 394 = 390KΩ,
564 = 560 KΩ, 115 = 1.1MΩ.

10種類の固定抵抗(J504)が使われている。左記参照。

3. Photo - SW

Electric current stops flowing under EV2 condition by function of photo-SW.

It can be checked with circuit tester as shown in Fig. 5.

No conductivity is shown under EV2 in the viewfinder and it should be conductive in brighter condition than EV2.

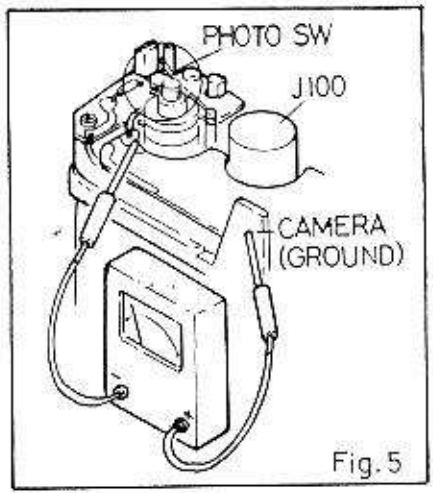


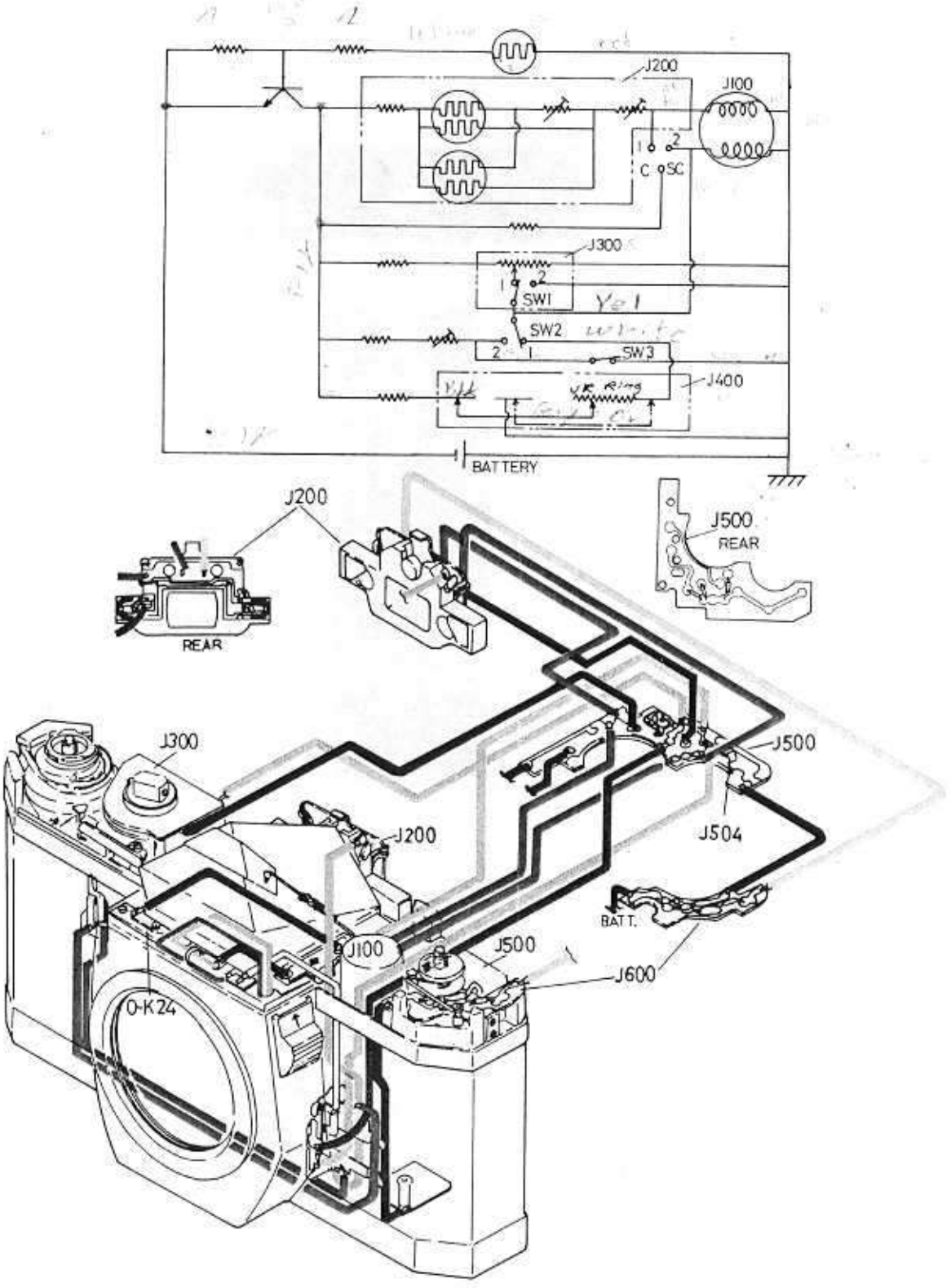
Fig. 5

3. フォトスウィッチ

電流はEV2以下ではフォトスウィッチの働きによって止まる様になっている。

Fig. 5 にかされている様にフォトスウィッチはサーキットテスターでチェック出来る。EV2以下では導通がなく、EV2以上で導通がある。

DISTRIBUTING WIRES



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16. ADJUSTMENT OF ELECTRONICAL EXPOSURE TIME

Adjustment of mechanical exposure time, as mentioned before, is basically the same with that of SPOTMATIC (Product No. 23102). After exposure time is adjusted mechanically, electronical exposure time is adjusted with the adjustable resistors installed in print pattern assembly (0-T1).

Open diaphragm metering.

f 8 DC5.7V ASA100 1X

	E.V.	EXPOSURE TIME
OPEN	EV16	1 ms
	EV12	15.6 ms
	EV8	250 ms
STOP	EV12	15.6 ms

Fig.26

Exclusive shutter speed testers are used for this adjustment. -ESST-1A, Light value correction unit, shutter speed testers (PA16-C or PA31-C).

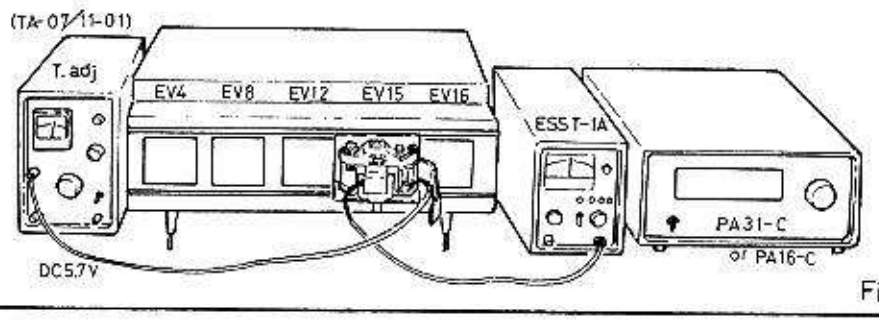


Fig.27

Put the camera on the camera stand equipped with light value correction unit. Set the camera as shown in Fig. 27
ASA 100, f8, 1X.
Electric power is supplied DC5.7V from T. adjuster through battery adaptor. Set speed dial assembly (0-E44)"AUTO"and slide the camera stand in front of EV12 window. After releasing the shutter, if exposure time shows slower (faster) than allowances, adjust the adjustable resistor (VR3) turning the slider to the right (left). Set speed dial assembly (0-E44) "AUTO" and slide the camera stand in front of EV16 window, check exposure time of 1/1000, when it shows slower (faster) than allowances, adjust the adjustable resistor (VR8).

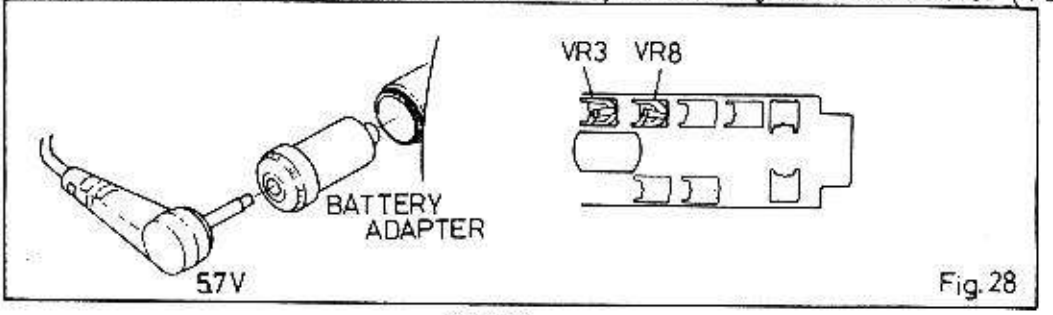


Fig.28

18. BATTERY CHECKER ADJUSTMENT

Battery checker is adjusted with DC4. 4V.
Set shutter dial at AUTOMATIC.
Depress the battery checker button and look at the needle through view finder. Check whether the needle comes in the slotted corner nearest 60, if it does not come, adjust the adjustable resistor (VR7).

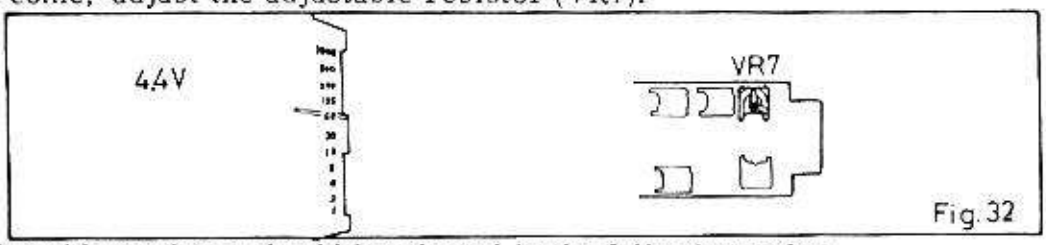


Fig. 32

Adjustable resistor should be ajusted in the following order.
VR3 ⟶ VR8 ⟶ VR2 ⟶ VR6 ⟶ VR5 ⟶ VR7
This order should be kept strictly.

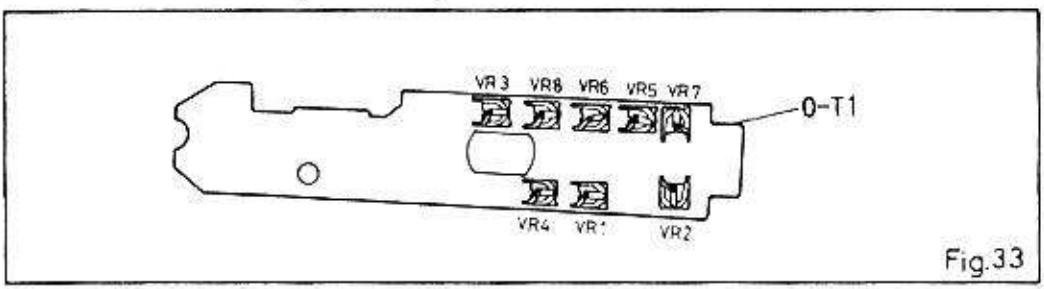


Fig. 33

VR1 &. VR4: These two resistors should never be adjusted in servicing

VR2: Stop down metering measurement
(EV12, f8, 1/60, ASA100, 1X, DC5.7V)

VR3: Open diaphragm metering measurement
(EV12, f8, 1/60 ASA100, 1X, DC5.7V)

VR5: Meter level adjustment
(EV8, 1/4 ASA100, 1X, DC5.7V)

VR6: Meter level adjustment
(EV16, 1/1000, ASA100, 1X, DC5.7V)

VR7: Battery checker
(DC4.4V, Pointing near place to 60)

VR8: Open diaphragm metering measurement
(EV16, f8, 1/1000, ASA100, 1X, DC5.7V)

19. OTHER ADJUSTMENTS

In this service manual, only the exclusive adjustments for ES camera (Product No. 23111) are described. So, the other adjustments, not described here like Mechanical back adjustment, Focusing and so forth, are quite same with SPOTMATIC (Product No. 23102).
Refer to the service manual of SPOTMATIC.

20. DISASSEMBLY

In disassembling ES camera, the following cares must be taken.

1. Front cover complete assembly (A0-A6):
   Unsolder the lead wires when taking out front cover.

2. Prism seat part
   Do not change the assorted combination of CdS and other connected electronical parts. After replacing the optical parts, exposure time and meter level should be adjusted.

3. Timing switch assembly (0-I1)
   After taking out Top cover assembly (0-A3), do not move or touch timing switch.

4. Shutter seat assembly (0-E2)
   After taking out shutter seat, Pallet release rod assembly (0-F9) may sometimes make the scratch to the 2nd curtain.

5. Distributing wires
   ES camera should be disassembled block by block, and the lead wires should be unsoldered if they have to be unsoldered.

6. Helicoid seat (A26)
   Helicoid seat should not be taken out before Front cover assembly (0-A6) and Resistor support ring assembly (0-K1) are taken out.

7. P. C. board pattern assembly (0-T1)
   After removing retainer screws, draw out this pattern with fingers quietly from connector. Do not touch the surface of adjustable resistors or other copper plates. If P. C. board pattern assembly (0-T1) is considered to have some troubles itself, replace it with new one.
   The small electronical parts on the P. C. board pattern assembly (0-T1) should never be replaced or repaired.

Characteristic features of ESII (23117)

ESII is the improved model from ASAHI PENTAX ES (Product No. 23111).

Therefore, various adjustments of ESII are same with those of ES.

Regarding to the adjustments, refer to SERVICE MANVAL of ES (23111).

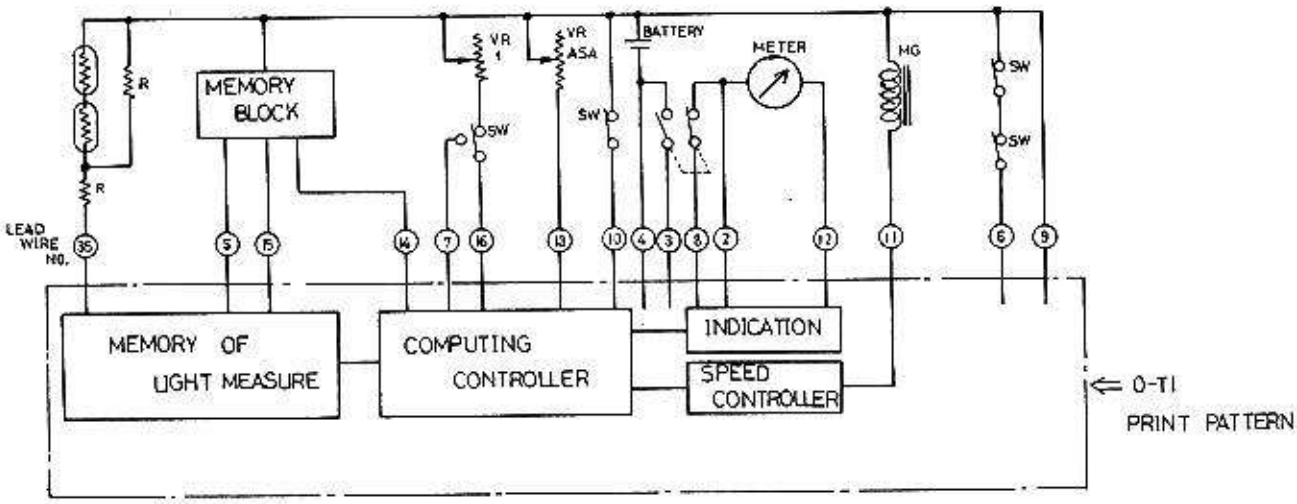
ESⅡの特徴

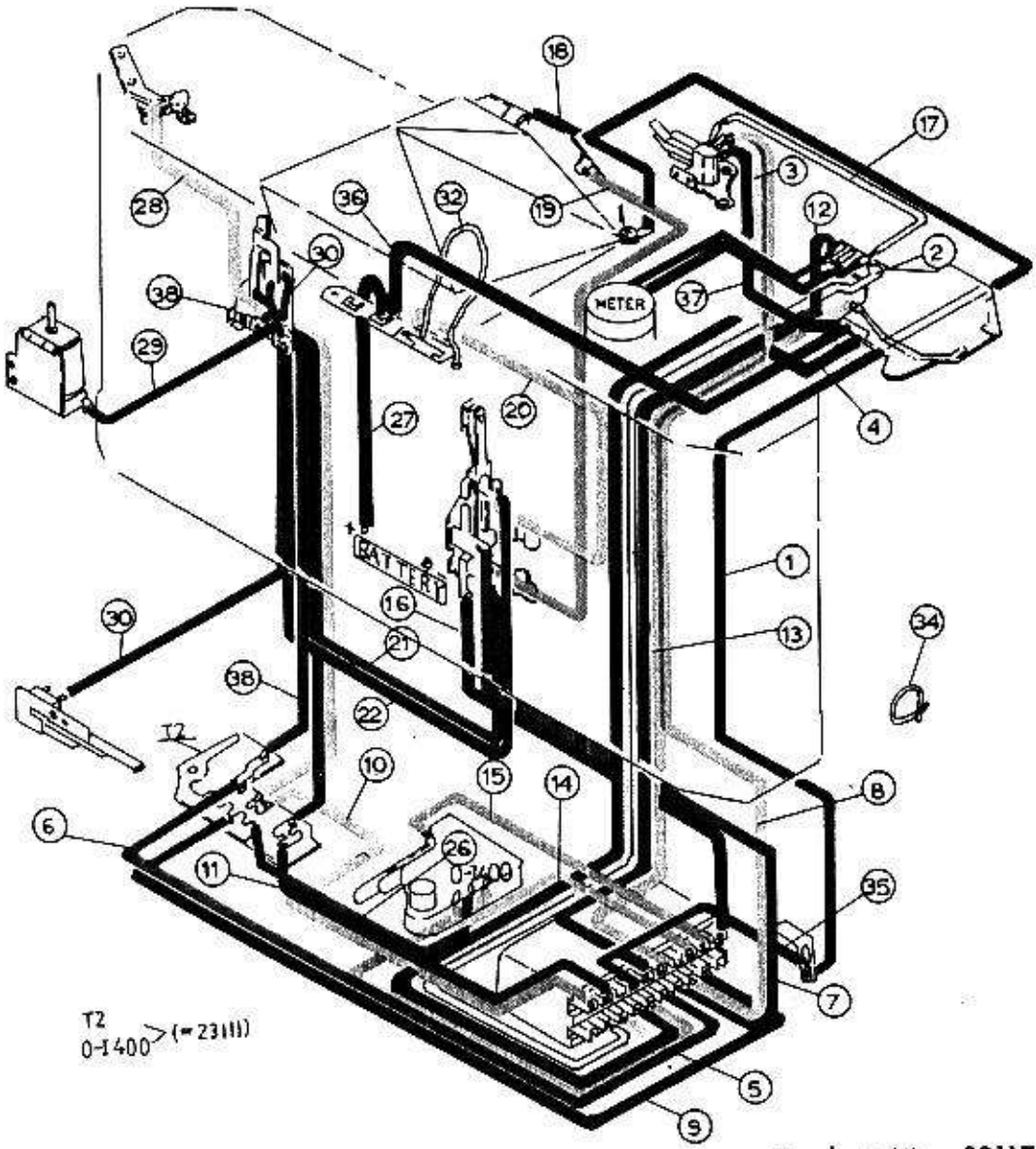
ESⅡはES (23111) の改良型である。

故に、種々の調整方法はES (23111) と同様である。

調整方法については、ESサービスマニュアル（英文のみ）を参照する。

CIRCUIT DIAGRAM





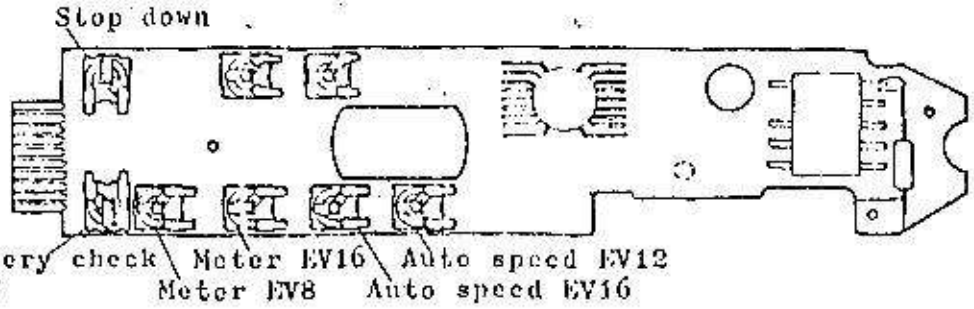
Product No. 23117

ASAHI PENTAX ES II Fig. 2-A

ES v. 1

TYPE I

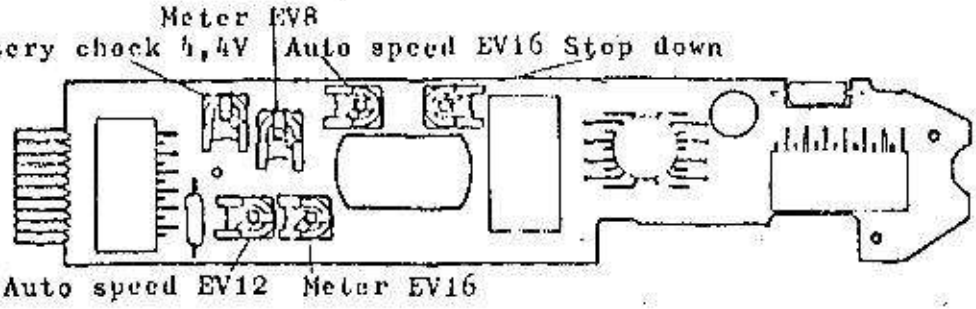
5,7V



ES v. 2
ES II v. 1

TYPE II

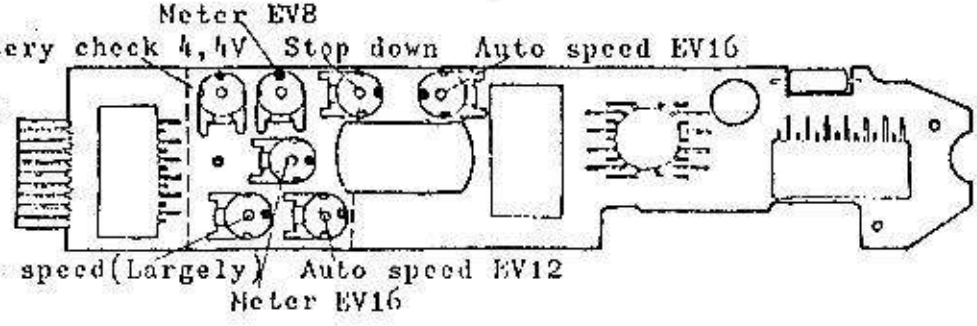
5,7V



ES II v. 2

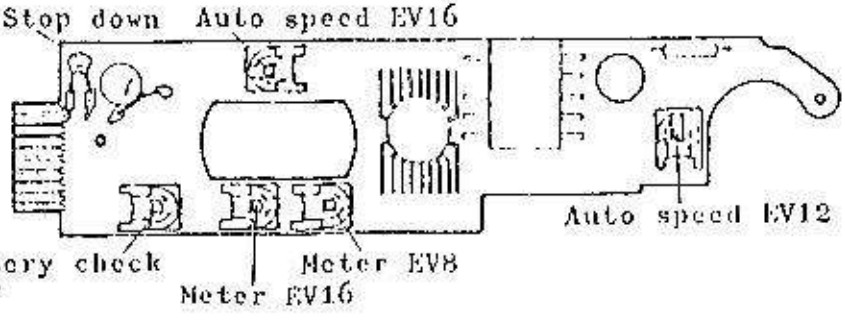
TYPE III

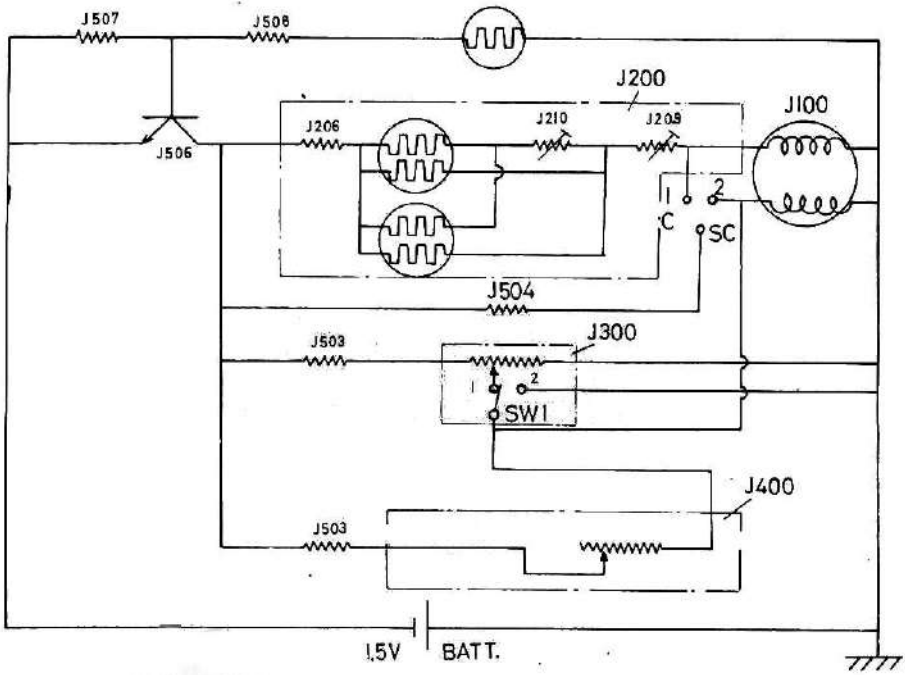
5,7V

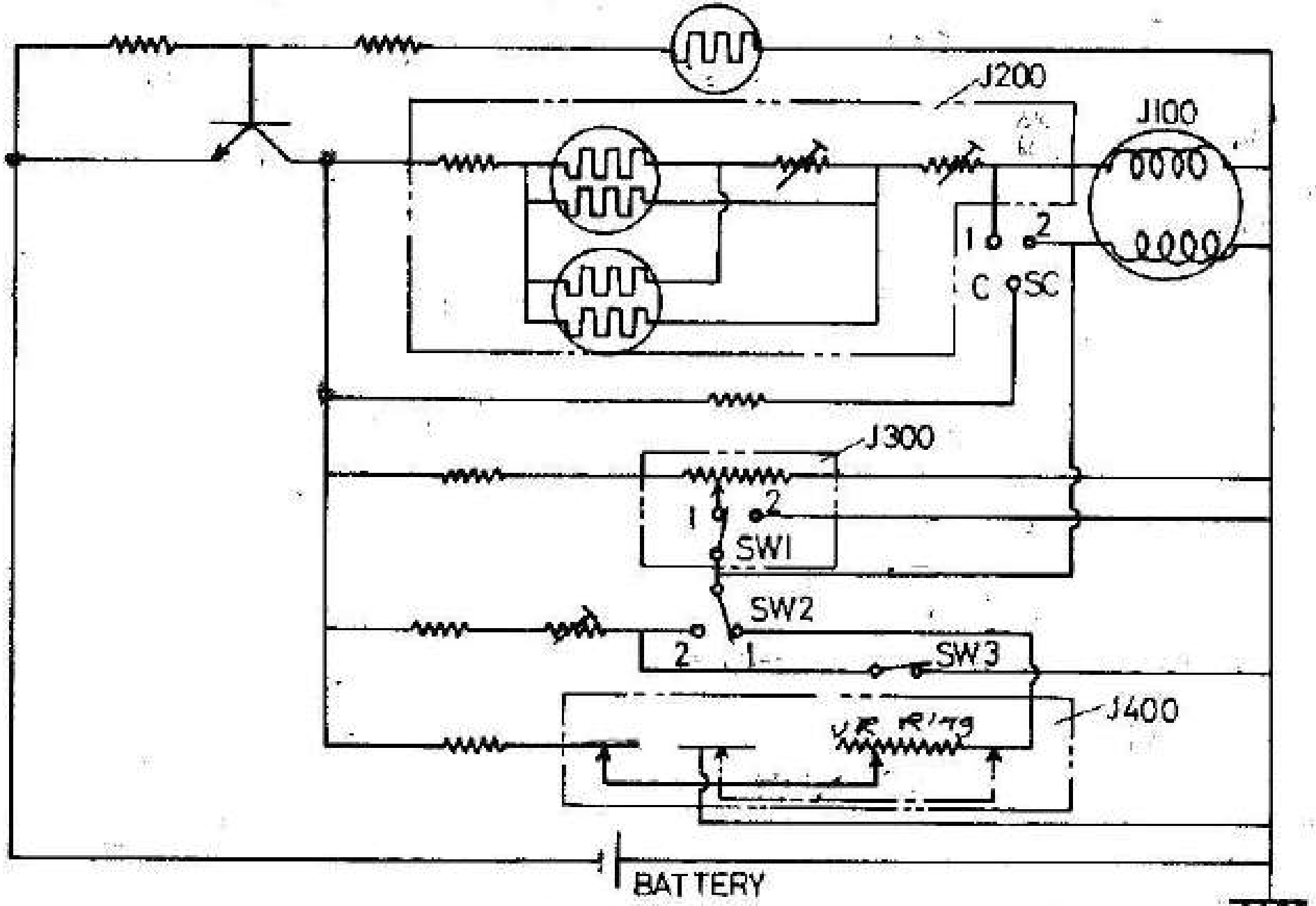


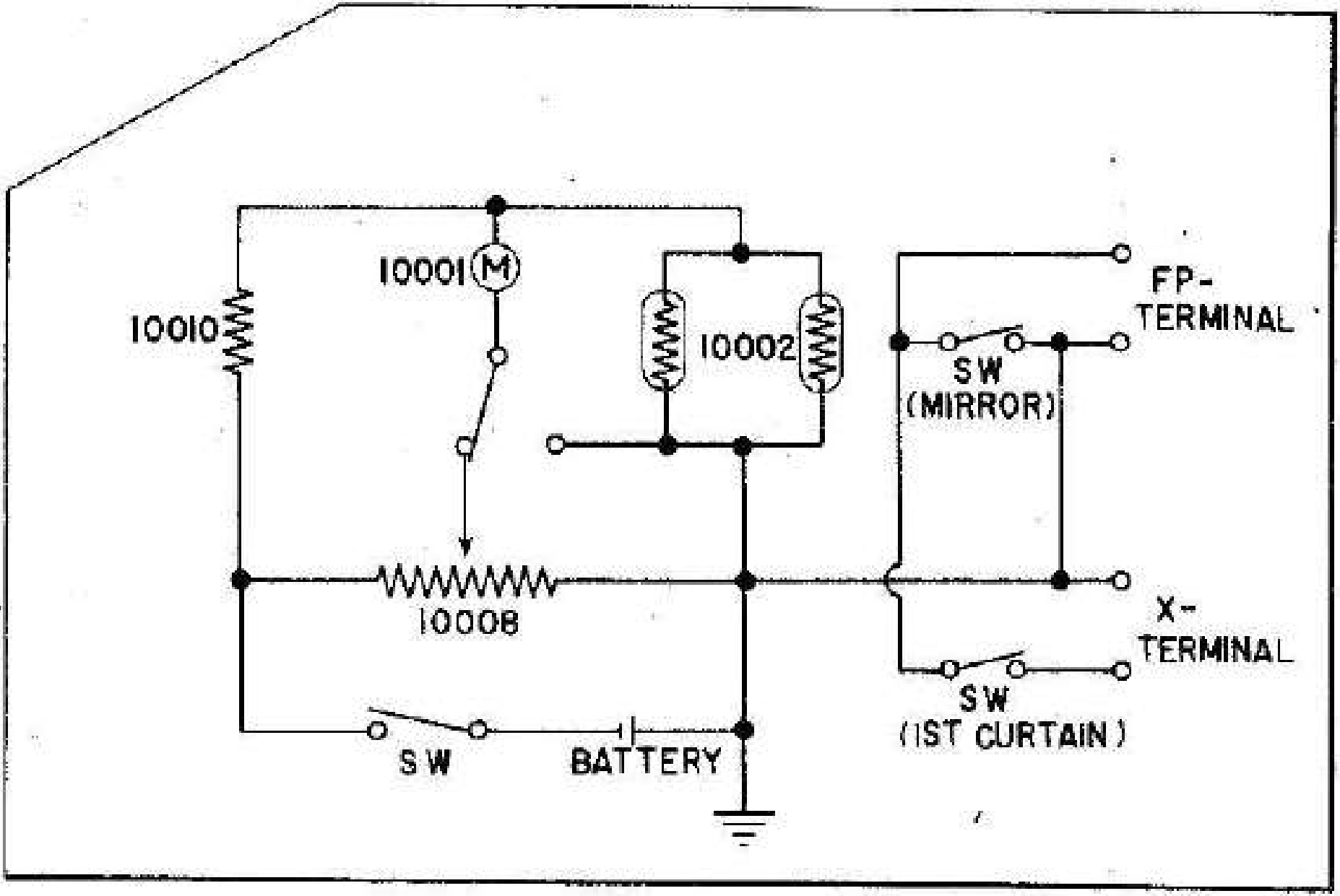
ES II MD

5,7V




J507
J508
J506
J200
J206
J210
J209
J100
1
2
C
SC
J504
J503
J300
1
2
SW1
J400
J503
1.5V
BATT.


J200
J100
1
2
C
SC
J300
1
2
SW1
SW2
2
1
SW3
J400
VAR RTG
BATTERY


10001
M
10010
10002
FP-
TERMINAL
SW
(MIRROR)
10008
X-
TERMINAL
SW
(1ST CURTAIN)
SW
BATTERY

Exposure meter circuits for Asahi/Honeywell Pentax SP (Spotmatic), SP-F (Spotmatic F) and KM. The circuit diagrams are from Asahi Optical Co. service manuals.

The SP meter circuit diagram also includes the flash sync circuit and covers the Spotmatic, SP500 and SP1000. Spotmatic II has same meter circuit but it has a flash hot shoe with FP/X selector switch. Spotmatic IIa has same meter circuit but has the Honeywell Strobonar flash sensor circuitry.

Physical layout of the actual circuit boards and wiring will differ among the different models and different production runs of the Spotmatic, but the circuit remained the same.

The KM meter circuit is the same as that of the Asahi Pentax K1000.

A look at the diagrams will confirm that all the circuits are relatively immune to battery voltage variations such as would be caused by substitution of 1.5 volt silver or alkaline cells for the 1.35 volt mercury cells originally used in the Spotmatic and SP-F. Such voltage variations affect the CdS sensor and the resistive legs of the circuits identically, thus balancing out the variations and obviating the need for Zinc-Air cells that are short-lived, Wein Cells that are equally short-lived and expensive, and diode adapters that serve to reduce 1.5 volts to 1.35 volts.